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NASA Tests Future Flight Vehicle Concepts

A hybrid rocket carrying futuristic space vehicle concepts completed its first flight December 18 from the NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Va. Launched at 6:15 a.m. EST, the rocket's bright plume was seen more than 200 miles away in New Jersey and Pennsylvania.

The rocket, built by Lockheed Martin Space Systems, New Orleans, was used to launch a NASA designed payload containing three test articles.

The purpose of the Suborbital Aerodynamic Reentry Experiments (SOREX-2) payload was to develop new high-speed flight test and control methods. These techniques may be applied to novel designs for high-speed flight and next generation planetary entry technology.

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"This suborbital rocket flight was intended to test these concepts at more than mach five or five times the speed of sound during reentry," according to Marc Murbach, a research engineer from the NASA Ames Research Center, Moffett Field, Calif. "We are trying to develop a wind tunnel in the sky. This capability may herald new techniques for the rapid development of innovative hypersonic flight concepts" The SOREX-2 project team is currently analyzing data on the payload's performance.

The payload, a joint project between Ames and Wallops, included a 'wave rider' flying wedge, a linear aerobrake (or hypersonic parachute), and a Slotted Compression Ramp Probe (SCRAMP), a super stable planetary reentry probe. The wedge is about 50 inches (127 centimeters) long and was to free fly like a glider after deployment.

The launch is the first test flight of a large hybrid propulsion system. Lockheed Martin's Michoud Operations designed and built the 60-foot (18 meters) long rocket to demonstrate that hybrid propulsion technology offers a low cost solution for delivering payloads. The two-foot (.6 meters) diameter rocket used liquid oxygen and solid fuel to provide a thrust of 60,000 pounds and achieved an altitude of approximately 43.5 miles (70 kilometers).

"Hybrid propulsion offers significant advantages over solid fuel propellants in that hybrids are non-explosive, able to be throttled, low cost and environmentally benign," said Randy Tassin, vice president, Program Management & Technical Operations for Lockheed Martin Space Systems, Michoud Operations, La.

Lockheed Martin signed a Space Act Agreement with NASA Marshall Space Flight Center, Huntsville, Ala., in 1999 to develop, test and launch the hybrid sounding rocket. The program goal is to develop a single-stage hybrid propulsion system capable of replacing existing two- and three-stage sounding rockets.

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